

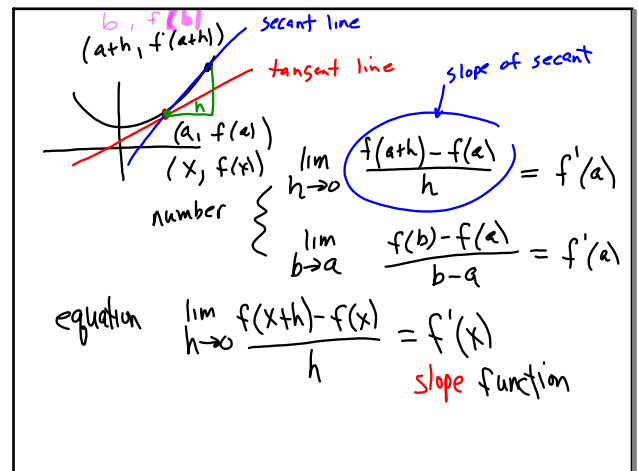
Review 3 Differentiable Functions

$f(x)$ is differentiable at $x=c$
means $f'(c)$ exists

$f(x)$ differentiable on $[a,b]$
 $f'(x)$ exists at every point in $[a,b]$

Not diff \checkmark \checkmark \rightarrow \curvearrowright \int \vdots
cusp corner jump hole vertical tangent VA

Feb 15-10:00 AM



Feb 15-10:06 AM

$$\lim_{h \rightarrow 0} \frac{\ln(2+h) - \ln(2)}{h} = \frac{1}{2}$$

der. of $\ln x$ at 2

$$\frac{1}{x} \text{ at } x=2$$

Feb 15-10:16 AM

$$f(x) = \begin{cases} 3-x, & x < 1 \\ ax^2 + bx, & x \geq 1 \end{cases}$$

a) what is the relation between a & b
so $f(x)$ is continuous at $x=1$

b) Find the values of a & b
so $f(x)$ is differentiable at $x=1$

a) $\lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^-} 3-x = 2$ so $a+b=2$

$$\lim_{x \rightarrow 1^+} f(x) = \lim_{x \rightarrow 1^+} ax^2 + bx = a+b$$

b) $f'(x) = \begin{cases} -1 & x < 1 \\ 2ax + b & x \geq 1 \end{cases}$ $f'(1) = 2a+b$

$$\begin{aligned} 2a+b &= -1 \\ -(a+b) &= 2 \\ \hline a &= -3 & b &= 5 \end{aligned}$$

Feb 15-10:19 AM

relation between diff & cont.

if diff then ^{has to} cont

If cont, not always diff

Feb 15-10:30 AM